



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RTID 0648-XC024

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to marine site characterization surveys off the coast of New Jersey and New York in the New York Bight

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from Attentive Energy LLC (Attentive Energy) for authorization to take marine mammals incidental to marine site characterization surveys off the coast of New Jersey and New York in the area of Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf Lease Area OCS-A 0538. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-time, one-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.harlacher@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period.

Comments, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Jenna Harlacher, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the “take” of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are proposed or, if the taking is

limited to harassment, a notice of a proposed incidental harassment authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other “means of effecting the least practicable adverse impact” on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as “mitigation”); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On April 11, 2022 NMFS received a request from Attentive Energy for an IHA to take marine mammals incidental to conducting marine site characterization surveys off the coast of New Jersey and New York in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf Lease Area (OCS)-A 0538. The application was deemed adequate and complete on May 23, 2022. Attentive Energy's request is for take of 15 species of marine mammals, by Level B harassment only. Neither Attentive Energy nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

Attentive Energy proposes to conduct marine site characterization surveys using high-resolution geophysical (HRG) acoustic sources in the Lease Area OCS-A 0538.

The purpose of the proposed surveys is to support the site characterization, siting, and engineering design of offshore wind project facilities including wind turbine generators, offshore substations, and submarine cables within the Lease Area. One survey vessel will operate as part of the proposed surveys. Underwater sound resulting from Attentive Energy's proposed site characterization survey activities, specifically HRG survey effort, has the potential to result in incidental take of marine mammals in the form of behavioral harassment.

Dates and Duration

The estimated duration of the surveys is expected to be up to 42 to 56 total survey days (6 to 8 weeks) within a single year in the Lease Area. A survey day is defined as a 24-hour survey period where 200 kilometer of track line is surveyed. This schedule is

based on 24-hours of operations for up to 8-weeks. In total there are 3,028 km of track line that would be surveyed within the Lease Area. The schedule presented here for this proposed project has accounted for potential down time due to inclement weather or other project-related delays, therefor actual survey time will be less than 8 weeks. Proposed activities would occur between August 1, 2022 and July 31, 2023.

Specific Geographic Region

Attentive Energy's proposed activities would occur in the Northwest Atlantic Ocean within Federal and state waters (Figure 1). Surveys would occur in the Lease Area off the coast of New York and New Jersey in the New York bight. Proposed activities would occur within the Commercial Lease of Submerged Lands for Renewable Energy Development in OCS-A 0538. The OCS Lease area is approximately 577.6 km² and is located between 30 and 60 meters water depth.



Figure 1. New York Bight Offshore Wind Lease Areas. Proposed Attentive Energy survey area is highlights with black hatching.

Detailed Description of Specific Activity

Attentive Energy's proposed marine site characterization surveys include HRG and geotechnical survey activities. These survey activities would occur within the Lease Area off the coasts of New York and New Jersey in the New York Bight. The proposed HRG and geotechnical survey activities are described below.

Proposed Geotechnical Survey Activities

Attentive Energy proposed geotechnical survey activities would include the drilling of sample boreholes, deep cone penetration tests, and shallow cone penetration tests. The geotechnical survey activity is not expected to result in take of marine mammals. Similar activities were performed before in a nearby lease area by Atlantic Shores, and considerations of the impacts produced from geotechnical activities have been previously analyzed and included in the proposed 2020 **Federal Register** notice for Atlantic Shores' HRG activities (85 FR 7926; February 12, 2020). In that notification, NMFS determined that the likelihood of the proposed geotechnical surveys resulting in harassment of marine mammals was to be so low as to be discountable. As this information remains applicable and NMFS' determination has not changed, these activities will not be discussed further in this proposed notification.

Proposed Geophysical Survey Activities

Attentive Energy has proposed that HRG survey operations would be conducted continuously 24 hours a day. Based on 24-hour operations, the estimated total duration of the proposed activities would be approximately 8 weeks. As previously discussed above, this schedule does include potential down time due to inclement weather or other project-related delays. The HRG survey will be conducted with primary track lines spaced at 150-meter (m) intervals and tie-lines spaced at 500 –m intervals.

The HRG survey activities will be supported by the use of a purpose-built survey vessel. These are designed with built-in A-frames and davits, permanently mounted winches, and other items on the deck specifically for survey operations. The geophysical survey activities proposed by Attentive Energy would include the following:

- Depth sounding to determine water depth, site bathymetry, and general bottom topography (multibeam echosounder);
- Magnetic intensity measurements (gradiometer) for detecting local variations in regional magnetic field from geological strata and potential ferrous objects on and below the bottom;
- Seafloor imaging (sidescan sonar survey) for seabed sediment classification purposes, to identify natural and human-made acoustic targets resting on the bottom as well as any anomalous features;
- Shallow-bottom penetration sub-bottom profiler (SBP) to map the near surface stratigraphy (top 0 to 10 m [33 feet] below seabed in sand and 0 to 15 m [49 feet] in mixed sediments); and
- Medium penetration SBP (sparker) to map deeper subsurface stratigraphy as needed (soils down to at least 100 m [328 ft] below seabed in sand and at least 125 m [410 feet] below seabed in mixed sediments).

The representative survey equipment that may be used in support of planned geophysical survey activities can be found in Table 0-3 of Attentive Energy's Application. The make and model of the listed geophysical equipment may vary depending on availability and the final equipment choices will vary depending upon the final survey design, vessel availability, and survey contractor selection. Geophysical surveys are expected to use several equipment types concurrently in order to collect multiple aspects of geophysical data along one transect. Selection of equipment combinations is based on specific survey objectives. All proposed HRG survey

equipment is listed in the application, including equipment that NMFS doesn't expect to result in take due to their higher frequencies and extremely narrow beam widths. Because of this, these sources were not considered when calculating the Level B harassment isopleths and are not discussed further in this notice. Acoustic parameters on this equipment can be found in Attentive Energy's IHA application on NMFS' website (<https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable>). We will only be discussing further the equipment listed below in Table 1. For equipment source level specifications noted in Table 1, a proxy representing the closest match in composition and operation of the Dual Geo-Spark was used from Crocker and Fratantonio (2016).

Table 1. Proposed Acoustic Equipment for HRG Surveys

HRG Equipment Type	Equipment Make/Model	Operating Frequency (kHz)	Source Level (RMS dB re 1 uPa @1m)	Reference for Source Level	Pulse Duration (milliseconds)	Repetition Rate (Hz)	Beam Width (degrees)
Mobile, Impulsive							
Deep SBP	Dual Geo-Spark 2000X (400 tip/500J)	0.3	203	Crocker and Fratantonio 2016*	1.1	4	180

* Applied Acoustics Dura-spark 500J to 2,000J as Proxy
 Key:
 RMS- Root mean square
 dB- Decibel
 re- referenced at
 m- meters
 SBP- Sub-bottom profiler
 Hz- hertz
 kHz- kilohertz
 uPa- microPascal

The deployment of HRG survey equipment, including the equipment planned for use during Attentive Energy proposed activities, produces sound in the marine environment that has the potential to result in harassment of marine mammals. Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation and Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments) and more general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS' website (<https://www.fisheries.noaa.gov/find-species>).

Table 2 lists all species and stocks for which take is expected and proposed to be authorized for this action and summarizes information related to the species and stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All species managed under the MMPA in this region are assessed in NMFS' 2021

draft U.S. Atlantic and Gulf of Mexico Stock Assessment Report SARs. All values presented in Table 2 are the most recent available at the time of publication and are available in the draft 2021 SARs (available online at:

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports>).

Table 2. Marine Mammal Species and Stocks Likely Impacted by the Specified Activities

Common Name	Scientific Name	Stock	ESA/MMPA status; strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
<i>Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)</i>						
North Atlantic right whale	<i>Eubalaena glacialis</i>	Western Atlantic Stock	E/D, Y	368 ⁴ (0; 364; 2019)	0.7	7.7
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-/-; Y	1,396 (0; 1,380; 2016)	22	12.15
Fin whale	<i>Balaenoptera physalus</i>	Western North Atlantic Stock	E/D, Y	6,802 (0.24; 5,573; 2016)	11	1.8
Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia Stock	E/D, Y	6,292 (1.02; 3,098; 2016)	6.2	0.8
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coastal Stock	-/-, N	21,968 (0.31; 17,002; 2016)	170	10.6
<i>Superfamily Odontoceti (toothed whales, dolphins, and porpoises)</i>						
Sperm whale	<i>Physeter macrocephalus</i>	North Atlantic Stock	E/D, Y	4,349 (0.28; 3,451; 2016)	3.9	0
Long-finned pilot whale	<i>Globicephala melas</i>	Western North Atlantic Stock	-/-, N	39,215 (0.3; 30,627; 2016)	306	29

Common Name	Scientific Name	Stock	ESA/MMPA status; strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic Stock	-/-, N	93,233 (0.71; 54,443; 2016)	544	227
Bottlenose dolphin	<i>Tursiops truncatus</i>	Western North Atlantic Offshore Stock	-/-, N	62,851 (0.23; 51,914; 2016)	519	28
Common dolphin	<i>Delphinus delphis</i>	Western North Atlantic Stock	-/-, N	172,974 (0.21, 145,216, 2016)	1,452	390
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Western North Atlantic Stock	-/-, N	39,921 (0.27; 32,032; 2016)	320	0
Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic Stock	-/-, N	35,215 (0.19; 30,051; 2016)	301	34
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy Stock	-/-, N	95,543 (0.31; 74,034; 2016)	851	164
<i>Order Carnivora—Superfamily Pinnipedia</i>						
Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic Stock	-/-, N	61,336 (0.08; 57,637; 2018)	1,729	339
Gray seal ⁵	<i>Halichoerus grypus</i>	Western North Atlantic Stock	-/-, N	27,300 (0.22; 22,785; 2016)	1,389	4,453

¹ - ESA status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

² - NMFS marine mammal stock assessment reports online at: www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments. CV is the coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable.

³ - These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike).

⁴ - The draft 2022 SARs have yet to be released; however, NMFS has updated its species web page to recognize the population estimate for NARWs is now below 350 animals (<https://www.fisheries.noaa.gov/species/north-atlantic-right-whale>).

⁵ - NMFS' stock abundance estimate (and associated PBR value) applies to U.S. population only. Total stock abundance (including animals in Canada) is approximately 451,431. The annual mortality and serious injury (M/SI) value given is for the total stock.

As indicated above, all 15 species listed in Table 2 temporally and spatially co-occur with the proposed activity to the degree that take is reasonably likely to occur.

The temporal and/or spatial occurrence of several cetacean and pinniped species is such that take of these species is not expected to occur either because they have very low densities in the survey area or are known to occur further inshore or offshore than the survey area. These include: blue whale (*Balaenoptera musculus*), Dwarf and pygmy sperm whale (*Kogia sima* and *Kogia breviceps*), killer whale (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), Cuvier's beaked whale (*Ziphius cavirostris*), Mesoplodont beaked whales (*Mesoplodon* spp.), short finned pilot whale (*Globicephala macrorhynchus*), white-beaked dolphin (*Lagenorhynchus albirostris*), pantropical spotted dolphin (*Stenella attenuata*), striped dolphin (*Stenella coeruleoalba*), harp seal (*Pagophilus groenlandicus*), and hooded seal (*Cystophora cristata*). As harassment and subsequent take of these species is not anticipated as a result of the proposed activities, these species are not analyzed or discussed further.

Below is a description of the species that have the highest likelihood of occurring in the survey area and are thus expected to potentially be taken by the proposed activities as well as further detail informing the status for select species (*i.e.*, information regarding current Unusual Mortality Events (UMEs) and important habitat areas).

North Atlantic Right Whale

The North Atlantic right whales range from calving grounds in the southeastern United States to feeding grounds in New England waters and into Canadian waters

(Hayes *et al.*, 2018). They are observed year round in the Mid-Atlantic Bight, and surveys have demonstrated the existence of seven areas where North Atlantic right whales congregate seasonally, including north and east of the proposed survey area in Georges Bank, off Cape Cod, and in Massachusetts Bay (Hayes *et al.*, 2018). In the late fall months (*e.g.*, October), right whales are generally thought to depart from the feeding grounds in the North Atlantic and move south to their calving grounds off Georgia and Florida. However, recent research indicates our understanding of their movement patterns remains incomplete (Davis *et al.*, 2017). A review of passive acoustic monitoring data from 2004 to 2014 throughout the western North Atlantic demonstrated nearly continuous year-round right whale presence across their entire habitat range (for at least some individuals), including in locations previously thought of as migratory corridors, suggesting that not all of the population undergoes a consistent annual migration (Davis *et al.*, 2017). Given that Attentive Energy's surveys would be concentrated offshore in the New York Bight, some right whales may be present year round however, the majority in the vicinity of the survey areas are likely to be transient, migrating through the area. Some may be present year round however, the majority migrating through

The western North Atlantic population demonstrated overall growth of 2.8 percent per year between 1990 to 2010, despite a decline in 1993 and no growth between 1997 and 2000 (Pace *et al.*, 2017). However, since 2010 the population has been in decline, with a 99.99 percent probability of a decline of just under 1 percent per year (Pace *et al.*, 2017). Between 1990 and 2015, calving rates varied substantially, with low calving rates coinciding with all three periods of decline or no growth (Pace *et al.*, 2017). On average, North Atlantic right whale calving rates are estimated to be roughly half that of southern right whales (*Eubalaena australis*) (Pace *et al.*, 2017), which are increasing in abundance (NMFS, 2015). In 2018, no new North Atlantic right whale calves were documented in their calving grounds; this represented the first time since annual NOAA

aerial surveys began in 1989 that no new right whale calves were observed. Eighteen right whale calves were documented in 2021. As of the end of 2021 two North Atlantic right whale calves have documented to have been born during this calving season.

The proposed survey area is part of a migratory corridor Biologically Important Area (BIA) for North Atlantic right whales (effective March-April and November-December) that extends from Massachusetts to Florida (LeBrecque *et al.*, 2015). Off the coast of New Jersey, the migratory BIA extends from the coast to beyond the shelf break. This important migratory area is approximately 269,488 km² in size (compared with the approximately 854 km² of total estimated Level B harassment ensonified area associated with the 8-week planned survey) and is comprised of the waters of the continental shelf offshore the East Coast of the United States, extending from Florida through Massachusetts. NMFS' regulations at 50 CFR part 224.105 designated nearshore waters of the Mid-Atlantic Bight as Mid-Atlantic U.S. Seasonal Management Areas (SMA) for right whales in 2008. SMAs were developed to reduce the threat of collisions between ships and right whales around their migratory route and calving grounds. A portion of one SMA, which occurs off the mouth of the New York Bight, is close to the proposed survey area. The SMA, which occurs off the mouth of the New York Bight, is active from November 1 through April 30 of each year. Within SMAs, the regulations require a mandatory vessel speed (less than 10 kn) for all vessels greater than 65 ft. Attentive Energy survey vessel, regardless of length, would be required to adhere to a 10 knot vessel speed restriction when operating within this SMA. In addition, Attentive Energy survey vessel, regardless of length, would be required to adhere to a 10 knot vessel speed restriction when operating in any Dynamic Management Area (DMA) declared by NMFS.

Elevated North Atlantic right whale mortalities have occurred since June 7, 2017, along the U.S. and Canadian coast. This event has been declared an Unusual Mortality

Event (UME), with human interactions, including entanglement in fixed fishing gear and vessel strikes, implicated in at least 15 of the mortalities thus far. As of June 2, 2022, a total of 34 confirmed dead stranded whales (21 in Canada; 13 in the United States) have been documented. The cumulative total number of animals that have stranded during the North Atlantic right whale UME has been updated to 50 individuals to include both the confirmed mortalities (dead stranded or floaters) (n=34) and seriously injured free-swimming whales (n=16) to better reflect the confirmed number of whales likely removed from the population during the UME and more accurately reflect the population impacts. More information is available online at: www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-north-atlantic-right-whale-unusual-mortality-event.

Recent aerial surveys in the New York Bight showed NARW in the proposed survey area in the winter and spring, preferring deeper waters near the shelf break (NARW observed in depths ranging from 33 – 1041m), but were observed throughout the survey area (Normandeau Associates and APEM, 2020; Zoidis et al., 2021). Similarly, passive acoustic data collected from 2018 to 2020 in the New York Bight showed detections of NARW throughout the year (Estabrook et al., 2021). Seasonally, NARW acoustic presence was highest in the fall. NARW can be anticipated to occur in the proposed survey area year-round but with lower levels in the summer from July – September.

Humpback Whale

Humpback whales are found worldwide in all oceans. Humpback whales were listed as endangered under the Endangered Species Conservation Act (ESCA) in June 1970. In 1973, the ESA replaced the ESCA, and humpbacks continued to be listed as endangered. On September 8, 2016, NMFS divided the species into 14 distinct population segments (DPS), removed the current species-level listing, and in its place listed four DPSs as endangered and one DPS as threatened (81 FR 62259; September 8, 2016). The

remaining nine DPSs were not listed. The West Indies DPS, which is not listed under the ESA, is the only DPS of humpback whale that is expected to occur in the survey area. Gulf of Maine humpback whales are designated as a stock under the MMPA and are also part of the West Indies DPS. However, humpback whales occurring in the survey area are not necessarily from the Gulf of Maine stock. Barco *et al.* (2002) estimated that, based on photo-identification, only 39 percent of individual humpback whales observed along the mid- and south Atlantic U.S. coast are from the Gulf of Maine stock. Bettridge *et al.* (2015) estimated the size of this population at 12,312 (95 percent CI 8,688-15,954) whales in 2004-05, which is consistent with previous population estimates of approximately 10,000-11,000 whales (Stevick *et al.*, 2003; Smith *et al.*, 1999) and the increasing trend for the West Indies DPS (Bettridge *et al.*, 2015).

Humpback whales utilize the mid-Atlantic as a migration pathway between calving/mating grounds to the south and feeding grounds in the north (Waring *et al.*, 2007a; Waring *et al.*, 2007b). A key question with regard to humpback whales off the Mid-Atlantic states is their stock identity. Furthermore, King *et al.* (2021) highlights important concerns for humpback whales found specifically in the nearshore environment (<10 km from shore) from various anthropogenic impacts.

Recent aerial surveys in the New York Bight observed humpback whales in the spring and winter, but sightings were reported year round in the area (Normandeau Associates and APEM, 2020). Humpback whales preferred deeper waters near the shelf break, but were observed throughout the area. Additionally, passive acoustic data recorded humpback whales in the New York Bight throughout the year, but the presence was highest in the fall and summer months (Estabrook *et al.*, 2021).

Three previous UMEs involving humpback whales have occurred since 2000, in 2003, 2005, and 2006. Since January 2016, elevated humpback whale mortalities have occurred along the Atlantic coast from Maine to Florida. Partial or full necropsy

examinations have been conducted on approximately half of the 159 known cases (as of June 2, 2022). Of the whales examined, about 50 percent had evidence of human interaction, either ship strike or entanglement. While a portion of the whales have shown evidence of pre-mortem vessel strike, this finding is not consistent across all whales examined and more research is needed. NOAA is consulting with researchers that are conducting studies on the humpback whale populations, and these efforts may provide information on changes in whale distribution and habitat use that could provide additional insight into how these vessel interactions occurred. More information is available at: www.fisheries.noaa.gov/national/marine-life-distress/2016-2021-humpback-whale-unusual-mortality-event-along-atlantic-coast.

Fin Whale

Fin whales are common in waters of the U. S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward (Waring *et al.*, 2016). Fin whales are present north of 35-degree latitude in every season and are broadly distributed throughout the western North Atlantic for most of the year (Waring *et al.*, 2016). They are typically found in small groups of up to five individuals (Brueggeman *et al.*, 1987). The main threats to fin whales are fishery interactions and vessel collisions (Waring *et al.*, 2016).

The western north Atlantic stock of fin whales includes the area from Central Virginia to Newfoundland/Labrador Canada. This region is primarily a feeding ground for this migratory species that tends to calve and breed in lower latitudes or offshore. There is currently no critical habitat designated for this species.

Recent aerial surveys in the New York Bight observed fin whales year-round throughout the survey area, but they preferred deeper waters near the shelf break (Normandeau Associates and APEM, 2020). Passive acoustic data from 2018 to 2020 also detected fin whales throughout the year (Estabrook *et al.*, 2021).

Sei Whale

The Nova Scotia stock of sei whales can be found in deeper waters of the continental shelf edge waters of the northeastern U.S. and northeastward to south of Newfoundland. The southern portion of the stock's range during spring and summer includes the Gulf of Maine and Georges Bank. Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank and into the Northeast Channel area, and along the southwestern edge of Georges Bank in the area of Hydrographer Canyon (Waring *et al.*, 2015). Sei whales occur in shallower waters to feed. Currently there is no critical habitat for sei whales, though they can be observed along the shelf edge of the continental shelf. The main threats to this stock are interactions with fisheries and vessel collisions.

Recently conducted aerial surveys in the New York Bight observed sei whales in both winter and spring, though they preferred deeper waters near the shelf break (Normandeau Associates and APEM, 2020). Passive acoustic data in the survey area detected sei whales throughout the year except January and July, with highest detections in March and April (Estabrook *et al.*, 2021).

Minke Whale

Minke whales can be found in temperate, tropical, and high-latitude waters. The Canadian East Coast stock can be found in the area from the western half of the Davis Strait (45°W) to the Gulf of Mexico (Waring *et al.*, 2016). This species generally occupies waters less than 100-m deep on the continental shelf. There appears to be a strong seasonal component to minke whale distribution in the survey areas, in which spring to fall are times of relatively widespread and common occurrence while during winter the species appears to be largely absent (Waring *et al.*, 2016). Recent aerial surveys in the New York Bight area found that minke whales were observed throughout the survey area, with highest numbers sighting in the spring months (Normandeau Associates and APEM, 2020).

Since January 2017, elevated minke whale mortalities have occurred along the Atlantic coast from Maine through South Carolina, with a total of 122 strandings (as of June 2, 2022). This event has been declared a UME. Full or partial necropsy examinations were conducted on more than 60 percent of the stranded whales. Preliminary findings in several of the whales have shown evidence of human interactions or infectious disease, but these findings are not consistent across all of the whales examined, so more research is needed. More information is available at: www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-minke-whale-unusual-mortality-event-along-atlantic-coast.

Sperm Whale

The distribution of the sperm whale in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring *et al.*, 2014). They are rarely found in waters less than 300 meters deep. The basic social unit of the sperm whale appears to be the mixed school of adult females plus their calves and some juveniles of both sexes, normally numbering 20-40 animals in all. There is evidence that some social bonds persist for many years (Christal *et al.*, 1998). This species forms stable social groups, site fidelity, and latitudinal range limitations in groups of females and juveniles (Whitehead, 2002). In summer, the distribution of sperm whales includes the area east and north of Georges Bank and into the Northeast Channel region, as well as the continental shelf (inshore of the 100-m isobath) south of New England. In the fall, sperm whale occurrence south of New England on the continental shelf is at its highest level, and there remains a continental shelf edge occurrence in the mid-Atlantic bight. In winter, sperm whales are concentrated east and northeast of Cape Hatteras.

Recent aerial studies observed sperm whales in the highest number in the summer, with a preference for the shelf break (Normandeau Associates and APEM,

2020). Passive acoustic recordings of sperm whale recorded them throughout the year, and again highest during spring and summer (Estabrook et al., 2021).

Risso's Dolphin

The status of the Western North Atlantic stock is not well understood. They are broadly distributed in tropical and temperate latitudes throughout the world's oceans, and the Western North Atlantic stock occurs from Florida to eastern Newfoundland. They are common on the northwest Atlantic continental shelf in summer and fall with lower abundances in winter and spring. Newer aerial surveys in the New York Bight area sighted Risso's dolphins throughout the year at the shelf break with highest abundances in spring and summer (Normandeau Associates and APEM, 2020).

Long-finned Pilot Whale

Long-finned pilot whales are found from North Carolina and north to Iceland, Greenland and the Barents Sea (Waring *et al.*, 2016). In U.S. Atlantic waters the species is distributed principally along the continental shelf edge off the northeastern U.S. coast in winter and early spring and in late spring, pilot whales move onto Georges Bank and into the Gulf of Maine and more northern waters and remain in these areas through late autumn (Waring *et al.*, 2016). Recently conducted aerial surveys in the New York Bight area noted a preference for deeper water at the shelf break throughout the year (Normandeau Associates and APEM, 2020).

Atlantic White-sided Dolphin

White-sided dolphins are found in temperate and sub-polar waters of the North Atlantic, primarily in continental shelf waters to the 100m depth contour from central West Greenland to North Carolina (Waring *et al.*, 2016). The Gulf of Maine stock is most common in continental shelf waters from Hudson Canyon to Georges Bank, and in the Gulf of Maine and lower Bay of Fundy. Sighting data indicate seasonal shifts in distribution (Northridge *et al.*, 1997). During January to May, low numbers of white-

sided dolphins are found from Georges Bank to Jeffreys Ledge (off New Hampshire), with even lower numbers south of Georges Bank, as documented by a few strandings collected on beaches of Virginia to South Carolina. From June through September, large numbers of white-sided dolphins are found from Georges Bank to the lower Bay of Fundy. From October to December, white-sided dolphins occur at intermediate densities from southern Georges Bank to southern Gulf of Maine (Payne and Heinemann, 1990). Sightings south of Georges Bank, particularly around Hudson Canyon, occur year round but at low densities. Recent aerial studies confirmed previous studies with observations in fall and winter in the New York Bight area with preference for deep water at the shelf break throughout the year (Normandeau Associates and APEM, 2020).

Atlantic Spotted Dolphin

Atlantic spotted dolphins are found in tropical and warm temperate waters ranging from southern New England, south to Gulf of Mexico and the Caribbean to Venezuela (Waring *et al.*, 2014). This stock regularly occurs in continental shelf waters south of Cape Hatteras and in continental shelf edge and continental slope waters north of this region (Waring *et al.*, 2014). There are two forms of this species, with the larger ecotype inhabiting the continental shelf and is usually found inside or near the 200-m isobaths (Waring *et al.*, 2014). They are relatively uncommon in the survey area.

Common Dolphin

The common dolphin is found worldwide in temperate to subtropical seas. In the North Atlantic, common dolphins are commonly found over the continental shelf between the 100-m and 2,000-m isobaths and over prominent underwater topography and east to the mid-Atlantic Ridge (Waring *et al.*, 2016). They have been observed in coastal and offshore waters, observed migrating to mid-Atlantic waters during winter months.

Bottlenose Dolphin

There are two distinct bottlenose dolphin morphotypes in the western North Atlantic: The coastal and offshore stocks (Waring *et al.*, 2016). The offshore stock is distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic Ocean from Georges Bank to the Florida Keys. The offshore stock is the only stock likely to occur in the survey area due to it being limited to the Lease area. The Western North Atlantic Offshore stock is generally observed along the outer continental shelf and slope in waters deeper than 34 m and over 34 km offshore (Torres *et al.*, 2003).

Harbor Porpoise

In the Lease Area, only the Gulf of Maine/Bay of Fundy stock may be present in the fall and winter. This stock is found in U.S. and Canadian Atlantic waters and is concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150-m deep (Waring *et al.*, 2016). They are seen from the coastline to deep waters (>1,800-m; Westgate *et al.*, 1998), although the majority of the population is found over the continental shelf (Waring *et al.*, 2016). The main threat to the species is interactions with fisheries, with documented take in the U.S. northeast sink gillnet, mid-Atlantic gillnet, and northeast bottom trawl fisheries and in the Canadian herring weir fisheries (Waring *et al.*, 2016).

Pinnipeds (Harbor Seal and Gray Seal)

The harbor seal is found in all nearshore waters of the North Atlantic and North Pacific Oceans and adjoining seas above about 30°N (Burns, 2009). In the western North Atlantic, harbor seals are distributed from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally to the Carolinas (Waring *et al.*, 2016). Haul-out and pupping sites are located off Manomet, MA and the Isles of Shoals, ME, but generally do not occur in areas in southern New England

(Waring *et al.*, 2016). They seasonal migrate down to the mid-Atlantic from fall to spring months.

There are three major populations of gray seals found in the world; eastern Canada (western North Atlantic stock), northwestern Europe and the Baltic Sea. Gray seals are regularly observed in the survey area in the survey area and these seals belong to the western North Atlantic stock. The range for this stock is thought to be from New Jersey to Labrador. Current population trends show that gray seal abundance is likely increasing in the U.S. Atlantic EEZ (Waring *et al.*, 2016). Although the rate of increase is unknown, surveys conducted since their arrival in the 1980s indicate a steady increase in abundance in both Maine and Massachusetts (Waring *et al.*, 2016). It is believed that recolonization by Canadian gray seals is the source of the U.S. population (Waring *et al.*, 2016). Documented haul outs for gray seas in Long Island area, with a possible rookery on Little Gull Island.

Since July 2018, elevated numbers of harbor seal and gray seal mortalities have occurred across Maine, New Hampshire and Massachusetts. This event has been declared a UME. Additionally, stranded seals have shown clinical signs (*e.g.* symptoms of disease) as far south as Virginia, although not in elevated numbers, therefore the UME investigation now encompasses all seal strandings from Maine to Virginia. Ice seals (harp and hooded seals) have also started stranding with clinical signs, again not in elevated numbers, and those two seal species have also been added to the UME investigation. A total of 3,152 reported strandings (of all species) had occurred from July 1, 2018, through March 13, 2020. Full or partial necropsy examinations have been conducted on some of the seals and samples have been collected for testing. Based on tests conducted thus far, the main pathogen found in the seals is phocine distemper virus. NMFS is performing additional testing to identify any other factors that may be involved in this UME. Presently, this UME is non-active and is pending closure by NMFS. Information on this

UME is available online at: www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/2018-2020-pinniped-unusual-mortality-event-along.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, etc.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

Table 3. Marine Mammal Hearing Groups (NMFS, 2018).

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, <i>Kogia</i> , river dolphins, Cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz
* Represents the generalized hearing range for the entire group as a composite (<i>i.e.</i> , all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall <i>et al.</i> 2007) and PW pinniped (approximation).	

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The **Estimated Take** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated Take** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals may or may not impact marine mammal species.

Background on Active Acoustic Sound Sources and Acoustic Terminology

This subsection contains a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to the specified activity and to the summary of the potential effects of the specified activity on marine mammals. For general information on sound and its interaction with the marine environment, please see, *e.g.*, Au and Hastings (2008); Richardson *et al.*, (1995); Urick (1983).

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the “loudness” of a sound and is typically described using the relative unit of the decibel. A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (μPa)), and is a logarithmic unit that accounts for large variations in amplitude. Therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1-m from the source (referenced to 1 μPa), while the received level is the SPL at the listener’s position (referenced to 1 μPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Root mean square accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing

behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

Sound exposure level (SEL; represented as dB re 1 $\mu\text{Pa}^2\text{-s}$) represents the total energy in a stated frequency band over a stated time interval or event and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.*, 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source and is represented in the same units as the rms sound pressure.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be directed either in a beam or in beams or may radiate in all directions (omnidirectional sources). The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound, which is defined as environmental background sound levels lacking a single source or point (Richardson *et al.*, 1995). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.*, vessels, dredging,

construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

The sum of the various natural and anthropogenic sound sources that comprise ambient sound at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and human activity) but on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals. Details of source types are described in the following text.

Sounds are often considered to fall into one of two general types: pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward, 1997 in Southall *et al.*, 2007). Please see Southall *et al.* (2007) for an in-depth discussion of these concepts. The distinction between these two sound types is not always obvious, as certain signals share properties of both pulsed and non-pulsed sounds. A signal near a source could be categorized as a pulse, but due to propagation effects as it moves farther from the source, the signal duration becomes longer (*e.g.*, Greene and Richardson, 1988).

Pulsed sound sources (*e.g.*, airguns, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986, 2005; Harris, 1998; NIOSH, 1998) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Sparkers produce pulsed signals with energy in the frequency ranges, 0.05-4.0 kHz. The amplitude of the acoustic wave emitted from sparker sources is equal in all

directions (*i.e.*, omnidirectional), while other sources planned for use during the proposed surveys have some degree of directionality to the beam.

Summary on Specific Potential Effects of Acoustic Sound Sources

Underwater sound from active acoustic sources can cause one or more of the following: temporary or permanent hearing impairment, behavioral disturbance, masking, stress, and non-auditory physical effects. The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Finneran, 2015). TS can be permanent (PTS; permanent threshold shift), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS; temporary threshold shift), in which case the animal's hearing threshold would recover over time (Southall *et al.*, 2007).

Animals in the vicinity of Attentive Energy proposed HRG survey activity are unlikely to incur even TTS due to the characteristics of the sound sources, which include generally very short pulses and potential duration of exposure. These characteristics mean that instantaneous exposure is unlikely to cause TTS, as it is unlikely that exposure would occur close enough to the vessel for received levels to exceed peak pressure TTS criteria, and that the cumulative duration of exposure would be insufficient to exceed cumulative sound exposure level (SEL) criteria. Even for high-frequency cetacean species (*e.g.*, harbor porpoises), which have the greatest sensitivity to potential TTS, individuals would have to make a very close approach and also remain very close to the vessel operating these sources in order to receive multiple exposures at relatively high levels, as would be necessary to cause TTS. Intermittent exposures—as would occur due to the brief, transient signals produced by these sources—require a higher cumulative SEL to induce TTS than would continuous exposures of the same duration (*i.e.*, intermittent exposure

results in lower levels of TTS). Moreover, most marine mammals would more likely avoid a loud sound source rather than swim in such close proximity as to result in TTS. Kremser *et al.* (2005) noted that the probability of a cetacean swimming through the area of exposure when a sub-bottom profiler emits a pulse is small—because if the animal was in the area, it would have to pass the transducer at close range in order to be subjected to sound levels that could cause TTS and would likely exhibit avoidance behavior to the area near the transducer rather than swim through at such a close range. Further, the restricted beam shape of many of HRG survey devices planned for use makes it unlikely that an animal would be exposed more than briefly during the passage of the vessel. No mortality, injury or Permanent Threshold Shift (PTS) are expected to occur.

Behavioral disturbance to marine mammals from sound may include a variety of effects, including subtle changes in behavior (*e.g.*, minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors. Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal.

In addition, sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.*, those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity,

and may occur whether the sound is natural (*e.g.*, snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.*, shipping, sonar, seismic exploration) in origin. Marine mammal communications would not likely be masked appreciably by the acoustic signals expected from Attentive Energy's surveys given the directionality of the signals for most HRG survey equipment types planned for use and the brief period when an individual mammal is likely to be exposed.

Classic stress responses begin when an animal's central nervous system perceives a potential threat to its homeostasis. That perception triggers stress responses regardless of whether a stimulus actually threatens the animal; the mere perception of a threat is sufficient to trigger a stress response (Moberg 2000; Seyle 1950). Once an animal's central nervous system perceives a threat, it mounts a biological response or defense that consists of a combination of the four general biological defense responses: behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses. In the case of many stressors, an animal's first and sometimes most economical (in terms of biotic costs) response is behavioral avoidance of the potential stressor or avoidance of continued exposure to a stressor. An animal's second line of defense to stressors involves the sympathetic part of the autonomic nervous system and the classical "fight or flight" response which includes the cardiovascular system, the gastrointestinal system, the exocrine glands, and the adrenal medulla to produce changes in heart rate, blood pressure, and gastrointestinal activity that humans commonly associate with "stress." These responses have a relatively short duration and may or may not have significant long-term effect on an animal's welfare. An animal's third line of defense to stressors involves its neuroendocrine systems; the system that has received the most study has been the hypothalamus-pituitary-adrenal system (also known as the HPA axis in mammals). Unlike stress responses associated with the autonomic nervous system, virtually all neuro-endocrine functions that are affected by stress—including immune

competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction (Moberg 1987; Rivier 1995), reduced immune competence (Blecha 2000), and behavioral disturbance. Increases in the circulation of glucocorticosteroids (cortisol, corticosterone, and aldosterone in marine mammals; see Romano *et al.*, 2004) have been long been equated with stress. The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and distress is the biotic cost of the response. In general, there are few data on the potential for strong, anthropogenic underwater sounds to cause non-auditory physical effects in marine mammals. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.*, 2007). There is currently no definitive evidence that any of these effects occur even for marine mammals in close proximity to an anthropogenic sound source. In addition, marine mammals that show behavioral avoidance of survey vessels and related sound sources are unlikely to incur non-auditory impairment or other physical effects. NMFS does not expect that the generally short-term, intermittent, and transitory HRG and geotechnical survey activities would create conditions of long-term, continuous noise and chronic acoustic exposure leading to long-term physiological stress responses in marine mammals.

Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fish, and zooplankton) (*i.e.*, effects to marine mammal habitat). Prey species exposed to sound might move away from the sound source, experience TTS, experience masking of biologically relevant sounds, or show no obvious direct effects. The most likely impacts (if any) for most prey species in a given area would be temporary avoidance of the area. Surveys using active acoustic sound sources move through an area, limiting exposure to multiple pulses. In all cases, sound levels would return to ambient once a survey ends and the noise source is

shut down and, when exposure to sound ends, behavioral and/or physiological responses are expected to end relatively quickly.

Vessel Strike

Vessel collisions with marine mammals, or ship strikes, can result in death or serious injury of the animal. These interactions are typically associated with large whales, which are less maneuverable than are smaller cetaceans or pinnipeds in relation to large vessels. Ship strikes generally involve commercial shipping vessels, which are generally larger and of which there is much more traffic in the ocean than geophysical survey vessels. Jensen and Silber (2004) summarized ship strikes of large whales worldwide from 1975-2003 and found that most collisions occurred in the open ocean and involved large vessels (*e.g.*, commercial shipping). For vessels used in geophysical survey activities, vessel speed while towing gear is typically only 4-5 knots. At these speeds, both the possibility of striking a marine mammal and the possibility of a strike resulting in serious injury or mortality are so low as to be discountable. At average transit speed for geophysical survey vessels, the probability of serious injury or mortality resulting from a strike is less than 50 percent. However, the likelihood of a strike actually happening is again low given the smaller size of these vessels and generally slower speeds. Notably in the Jensen and Silber study, no strike incidents were reported for geophysical survey vessels during that time period.

Marine Mammal Habitat

The HRG survey equipment will not contact the seafloor and does not represent a source of pollution. We are not aware of any available literature on impacts to marine mammal prey from sound produced by HRG survey equipment. However, as the HRG survey equipment introduces noise to the marine environment, there is the potential for it to result in avoidance of the area around the HRG survey activities on the part of marine

mammal prey. Any avoidance of the area on the part of marine mammal prey would be expected to be short term and temporary.

Because of the temporary nature of the disturbance, and the availability of similar habitat and resources (*e.g.*, prey species) in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations. Impacts on marine mammal habitat from the proposed activities will be temporary, insignificant, and discountable.

The potential effects of Attentive Energy's specified survey activity are expected to be limited to Level B behavioral harassment. No permanent or temporary auditory effects, or significant impacts to marine mammal habitat, including prey, are expected.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determinations.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to noise from certain HRG acoustic sources. Based on the nature of the activity, Level A harassment is neither anticipated nor proposed to be authorized. Take by Level A

harassment (injury) is considered unlikely, even absent mitigation, based on the characteristics of the signals produced by the acoustic sources planned for use, and is not proposed for authorization. Implementation of required mitigation further reduces this potential. Furthermore and as described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels; and, (3) the density or occurrence of marine mammals within these ensonified areas. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area),

and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.*, 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB (referenced to 1 micropascal (re 1 μ Pa)) for continuous (*e.g.*, vibratory pile-driving, drilling) and above RMS SPL 160 dB re 1 μ Pa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

Level A harassment – NMFS’ Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS’ 2018 Technical Guidance, which may be accessed at: www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

Table 4. Thresholds Identifying the Onset of Permanent Threshold Shift.

Hearing Group	PTS Onset Acoustic Thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	<i>Cell 1</i> $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	<i>Cell 2</i> $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	<i>Cell 3</i> $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	<i>Cell 4</i> $L_{E,MF,24h}$: 198 dB

	PTS Onset Acoustic Thresholds* (Received Level)	
High-Frequency (HF) Cetaceans	<i>Cell 5</i> $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	<i>Cell 6</i> $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	<i>Cell 7</i> $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	<i>Cell 8</i> $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	<i>Cell 9</i> $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	<i>Cell 10</i> $L_{E,OW,24h}$: 219 dB
<p>* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.</p> <p><u>Note</u>: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1 μPa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (<i>i.e.</i>, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.</p>		

Ensonified Area

Here, we describe operational and environmental parameters of the proposed survey activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

NMFS has developed a user-friendly methodology for estimating the extent of the Level B harassment isopleths associated with relevant HRG survey equipment (NMFS 2020). This methodology incorporates frequency and directionality to refine estimated ensonified zones. For acoustic sources that operate with different beamwidths, the maximum beamwidth was used, and the lowest frequency of the source was used when calculating the frequency-dependent absorption coefficient (Table 1).

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG survey equipment and, therefore, recommends that source levels provided by Crocker and

Fratantonio (2016) be incorporated in the method described above to estimate isopleth distances to harassment thresholds. In cases when the source level for a specific type of HRG equipment is not provided in Crocker and Fratantonio (2016), NMFS recommends that either the source levels provided by the manufacturer be used, or, in instances where source levels provided by the manufacturer are unavailable or unreliable, a proxy from Crocker and Fratantonio (2016) be used instead. Table 1 shows the HRG equipment types used during the proposed surveys and the source levels associated with those HRG equipment types.

The results of the Level B harassment ensounded area analysis using the methodology described indicated that, of the HRG survey equipment planned for use by Attentive Energy the only one that has the potential to result in Level B harassment of marine mammals, the Dual Geo-Spark, has a Level B harassment isopleth of 141-m.

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including density or other relevant information that will inform the take calculations.

Habitat-based density models produced by the Duke University Marine Geospatial Ecology Laboratory and the Marine-life Data and Analysis Team, based on the best available marine mammal data from 1992-2021 obtained in a collaboration between Duke University, the Northeast Regional Planning Body, the University of North Carolina Wilmington, the Virginia Aquarium and Marine Science Center, and NOAA (Roberts *et al.*, 2016a; Curtice *et al.*, 2018), represent the best available information regarding marine mammal densities in the proposed survey area. More recently, these data have been updated with new modeling results and include density estimates for pinnipeds (Roberts *et al.*, 2016b, 2017, 2018).

The density data presented by Roberts *et al.*, (2016b, 2017, 2018, 2021) incorporates aerial and shipboard line-transect survey data from NMFS and other

organizations and incorporates data from eight physiographic and 16 dynamic oceanographic and biological covariates, and controls for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. These density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.*, 2016a). In subsequent years, certain models have been updated based on additional data as well as certain methodological improvements. More information is available online at <https://seamap.env.duke.edu/models/Duke/EC/>.

Marine mammal density estimates in the survey area (animals/km²) were obtained using the most recent model results for all taxa (Roberts *et al.*, 2016b, 2017, 2018, 2020). The updated models incorporate additional sighting data, including sightings from NOAA's Atlantic Marine Assessment Program for Protected Species (AMAPPS) surveys.

For the exposure analysis, density data from Roberts *et al.*, (2016b, 2017, 2018, 2021) were mapped using a geographic information system (GIS). For the survey area, the monthly densities of each species as reported by Roberts *et al.* (2016b, 2017, 2018, 2021) were averaged by season; thus, a density was calculated for each species for spring, summer, fall and winter. To be conservative, the greatest seasonal density calculated for each species was then carried forward in the exposure analysis, with a few exceptions noted later. Estimated seasonal densities (animals/km²) of marine mammal species that may be taken by the proposed survey are in Table 5 below. The maximum seasonal density values used to estimate take numbers are shown in Table 6 below. Below, we discuss how densities were assumed to apply to specific species for which the Roberts *et al.* (2016b, 2017, 2018, 2021) models provide results at the genus or guild level.

For bottlenose dolphin densities, Roberts *et al.*, (2016b, 2017, 2018) do not differentiate by stock. The Western North Atlantic northern migratory coastal stock is generally expected to occur only in coastal waters from the shoreline to approximately the 20-m (65-ft) isobath (Hayes *et al.*, 2018). As the Lease Area is located within depths

exceeding 20-m, where the offshore stock would generally be expected to occur, all calculated bottlenose dolphin exposures within the survey area were assigned to the offshore stock. Bottlenose dolphins densities were also calculated using the single month with the highest density to account for recent observations from IHAs issued in the New York Bight area, which documented more dolphins than the output of the Roberts' model predicted (86 FR 26465, May 10, 2021 and 85 FR 21198, April 16, 2020).

For long-finned pilot whales, the Roberts *et al.* (2016, 2017) data only provide a single raster grid containing annual density estimate for *Globicephala* species (*i.e.*, short-finned and long-finned pilot whales combined). The annual density raster grid was used to estimate density in the survey area and assumed it applies only to long-finned pilot whales, as short-finned pilot whales are not anticipated to occur as far north as the survey area.

Furthermore, the Roberts *et al.* (2016b, 2017, 2018) density model does not differentiate between the different pinniped species. For seals, given their size and behavior when in the water, seasonality, and feeding preferences, there is limited information available on species-specific distribution. Density estimates of Roberts *et al.* (2016, 2018) include all seal species that may occur in the Western North Atlantic combined (*i.e.*, harbor, gray, hooded, and harp). For this IHA, only the harbor seals and gray seals are reasonably expected to occur in the survey area; densities of seals were split evenly between these two species.

Table 5. Estimated marine mammal densities (animals per km²) for Lease Area

Species	Spring	Summer	Fall	Winter	Monthly Max	Annual Mean
Mysticetes						
North Atlantic Right Whale	0.00352	0.00004	0.00011	0.00172	0.00515	0.00135
Humpback Whale	0.00062	0.00022	0.00036	0.00012	0.00076	0.00033

Species	Spring	Summer	Fall	Winter	Monthly Max	Annual Mean
Fin Whale	0.00258	0.00314	0.00227	0.00162	0.00444	0.00240
Sei Whale	0.00016	0.00003	0.00003	0.00002	0.00025	0.00006
Common Minke Whale	0.00190	0.00075	0.00054	0.00066	0.00286	0.00096
Odontocetes						
Sperm Whale	0.00004	0.00054	0.00037	0.00002	0.00104	0.00024
Risso's Dolphin	0.00018	0.00108	0.00034	0.00046	0.00179	0.00052
Long-finned Pilot Whale	N/A	N/A	N/A	N/A	N/A	0.00471
Atlantic White-sided Dolphin	0.03038	0.01714	0.01310	0.02069	0.05016	0.02033
Short-beaked Common Dolphin	0.05495	0.04535	0.05959	0.13725	0.18987	0.07428
Atlantic Spotted Dolphin	0.00054	0.00599	0.00516	0.00024	0.00843	0.00298
Harbor Porpoise	0.07644	0.00042	0.00175	0.03952	0.12475	0.02953
Common Bottlenose Dolphin	0.01265	0.01828	0.04450	0.02509	0.05284	0.02513
Pinnipeds						
Gray Seal	0.01540	0.00021	0.00015	0.00837	0.01961	0.00604
Harbor Seal	0.01540	0.00021	0.00015	0.00837	0.01961	0.00604

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization.

In order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in harassment, radial distances to predicted isopleths corresponding to Level B harassment thresholds are calculated, as described above. The maximum distance (*i.e.*, 141-m distance associated with the Dual Geo-Spark 2000X) to the

Level B harassment criterion and the total length of the survey trackline are then used to calculate the total ensonified area, or zone of influence (ZOI) around the survey vessel.

Attentive Energy estimates that proposed surveys will complete a total of 3,028 km survey trackline during proposed HRG surveys. Based on the maximum estimated distance to the Level B harassment threshold of 141-m (Table 5) and the total survey length, the total ensonified area is therefore 854 km² based on the following formula:

$$\text{Mobile Source ZOI} = (\text{Total survey length} \times 2r) + \pi r^2$$

Where: total survey length= the total distance of the survey track lines within the lease area; and r = the maximum radial distance from a given sound source to the Level B harassment threshold.

As described above, this is a conservative estimate as it assumes the HRG source that results in the greatest isopleth distance to the Level B harassment threshold would be operated at all times during the entire survey, which may not ultimately occur.

The number of marine mammals expected to be incidentally taken during the total survey is then calculated by estimating the number of each species predicted to occur within the ensonified area (animals/km²), incorporating the maximum seasonal estimated marine mammal densities as described above. The product is then rounded, to generate an estimate of the total number of instances of harassment expected for each species over the duration of the survey. A summary of this method is illustrated in the following formula with the resulting proposed take of marine mammals is shown below in Table 6:

$$\text{Estimated Take} = D \times \text{ZOI}$$

Where: *D* = average species density (per km²); and *ZOI* = maximum daily ensonified area to relevant thresholds.

Table 6 -- Numbers of Potential Incidental Take of Marine Mammals Proposed for Authorization and Proposed Takes as a Percentage of Population

Species	Abundance*	Estimated Level B Takes	Total	
			Level B Takes Proposed for Authorization	Percent of Abundance
North Atlantic right whale	368	3	3	0.82
Humpback whale	1,396	1	2†	0.14
Fin whale	6,802	3	3	<0.1
Sei whale	6,292	0	2†	<0.1
Minke whale	21,968	2	2	<0.1
Sperm whale	4,349	0	2†	<0.1
Long-finned pilot whale	39,215	4	15†	<0.1
Bottlenose dolphin (W.N. Atlantic Offshore) ^a	62,851	38	38	<0.1
Common dolphin	172,974	162	162	<0.1
Atlantic white-sided dolphin	93,233	26	26	<0.1
Atlantic spotted dolphin	39,921	5	31†	<0.1
Risso's dolphin	32,215	1	9†	<0.1
Harbor porpoise	95,543	65	65	<0.1
Harbor seal	61,336	13	13	<0.1
Gray seal ^a	451,431	13	13	<0.1

*The abundances in this column are based on the NMFS draft 2021 SAR

† Take request based on average group size using sightings data from Palka et al. (2017, 2021) and CETAP (1982). See Appendix C for data.

^aThis abundance estimate is the total stock abundance (including animals in Canada). The NMFS stock abundance estimate for US population only is 27,300.

The take numbers proposed for authorization in Table 6 are consistent with those requested by Attentive Energy. NMFS concurs with Attentive Energy's method of revising take estimates to reflect mean group size where the estimated takes were less than a typical group size (Palka *et al.*, 2017, 2021; CETAP 1982).

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity and other means of

effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

Proposed Mitigation Measures

NMFS proposes that the following mitigation measures be implemented during Attentive Energy's planned marine site characterization surveys. Pursuant to section 7 of the ESA, Attentive Energy is also required to adhere to relevant Project Design Criteria (PDC) of the NMFS' Greater Atlantic Regional Fisheries Office (GARFO) programmatic consultation (specifically PDCs 4, 5, and 7) regarding geophysical surveys along the U.S.

Atlantic coast (<https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic#offshore-wind-site-assessment-and-site-characterization-activities-programmatic-consultation>).

Marine Mammal Exclusion Zones and Level B Harassment Zones

Marine mammal Exclusion Zones would be established around the HRG survey equipment and monitored by protected species observers (PSOs). These PSOs will be NMFS-approved visual PSOs. Based upon the acoustic source in use (impulsive: sparkers), a minimum of one PSO must be on duty on the source vessel during daylight hours and two PSOs must be on duty on the source vessel during nighttime hours. These PSO will monitor Exclusion Zones based upon the radial distance from the acoustic source rather than being based around the vessel itself. The Exclusion Zone distances are as follows:

- A 500-m Exclusion Zone for North Atlantic right whales during use of specified acoustic sources (impulsive: sparkers).
- A 100-m Exclusion Zone for all other marine mammals (excluding NARWs) during use of specified acoustic sources (except as specified below).

All visual monitoring must begin no less than 30 minutes prior to the initiation of the specified acoustic source and must continue until 30 minutes after use of specified acoustic sources ceases.

If a marine mammal were detected approaching or entering the Exclusion Zones during the HRG survey, the vessel operator would adhere to the shutdown procedures described below to minimize noise impacts on the animals. These stated requirements will be included in the site-specific training to be provided to the survey team.

Ramp-Up of Survey Equipment and Pre-Clearance of the Exclusion Zones

When technically feasible, a ramp-up procedure would be used for HRG survey equipment capable of adjusting energy levels at the start or restart of survey activities. A

ramp-up would begin with the powering up of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. The ramp-up procedure would be used in order to provide additional protection to marine mammals near the survey area by allowing them to vacate the area prior to the commencement of survey equipment operation at full power. When technically feasible, the power would then be gradually turned up and other acoustic sources would be added. All ramp-ups shall be scheduled so as to minimize the time spent with the source being activated.

Ramp-up activities will be delayed if a marine mammal(s) enters its respective Exclusion Zone. Ramp-up will continue if the animal has been observed exiting its respective Exclusion Zone or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for harbor porpoise and 30 minutes for all other species).

Attentive Energy would implement a 30 minute pre-clearance period of the Exclusion Zones prior to the initiation of ramp-up of HRG equipment. The operator must notify a designated PSO of the planned start of ramp-up not less than 60 minutes prior to the planned ramp-up. This would allow the PSOs to monitor the Exclusion Zones for 30 minutes prior to the initiation of ramp-up. Prior to ramp-up beginning, Attentive Energy must receive confirmation from the PSO that the Exclusion Zone is clear prior to proceeding. During this 30 minute pre-start clearance period, the entire applicable Exclusion Zones must be visible. The exception to this would be in situations where ramp-up may occur during periods of poor visibility (inclusive of nighttime) as long as appropriate visual monitoring has occurred with no detections of marine mammals in 30 minutes prior to the beginning of ramp-up. Acoustic source activation may occur at night only where operational planning cannot reasonably avoid such circumstances.

During this period, the Exclusion Zone will be monitored by the PSOs, using the appropriate visual technology. Ramp-up may not be initiated if any marine mammal(s) is within its respective Exclusion Zone. If a marine mammal is observed within an

Exclusion Zone during the pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting its respective Exclusion Zone or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for harbor porpoise and 30 minutes for all other species). If a marine mammal enters the Exclusion Zone during ramp-up, ramp-up activities must cease and the source must be shut down. Any PSO on duty has the authority to delay the start of survey operations if a marine mammal is detected within the applicable pre-start clearance zones. The prestart clearance requirement does not include small delphinids (genera *Stenella*, *Lagenorhynchus*, *Delphinus*, or *Tursiops*) or seals.

The pre-clearance zones would be:

- 500-m for all ESA-listed species (North Atlantic right, sei, fin, sperm whales); and
- 100-m for all other marine mammals.

If any marine mammal species that are listed under the ESA are observed within the clearance zones, the clock must be paused. If the PSO confirms the animal has exited the zone and headed away from the survey vessel, the clock that was paused may resume. The pre-clearance clock will reset if the animal dives or visual contact is otherwise lost.

If the acoustic source is shut down for brief periods (*i.e.*, less than 30 minutes) for reasons other than implementation of prescribed mitigation (*e.g.*, mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual observation and no detections of marine mammals have occurred within the applicable Exclusion Zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.

Activation of survey equipment through ramp-up procedures may not occur when visual detection of marine mammals within the pre-clearance zone is not expected to be effective (*e.g.*, during inclement conditions such as heavy rain or fog).

The acoustic source(s) must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source shall be avoided.

Shutdown Procedures

An immediate shutdown of the impulsive HRG survey equipment (Table 5) would be required if a marine mammal is sighted entering or within its respective Exclusion Zone(s). Any PSO on duty has the authority to call for a shutdown of the acoustic source if a marine mammal is detected within the applicable Exclusion Zones. Any disagreement between the PSO and vessel operator should be discussed only after shutdown has occurred. The vessel operator would establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the HRG source(s) to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.

The shutdown requirement is waived for small delphinids (belonging to the genera of the Family *Delphinidae*: *Delphinus*, *Lagenorhynchus*, *Stenella*, or *Tursiops*) and pinnipeds if they are visually detected within the applicable Exclusion Zones. If a species for which authorization has not been granted or a species for which authorization has been granted but the authorized number of takes have been met approaches or is observed within the applicable Exclusion Zone, shutdown would occur. In the event of uncertainty regarding the identification of a marine mammal species (*i.e.*, such as whether the observed marine mammal belongs to *Delphinus*, *Lagenorhynchus*, *Stenella*, or *Tursiops* for which shutdown is waived), PSOs must use their best professional judgement in making the decision to call for a shutdown.

Upon implementation of a shutdown, the sound source may be reactivated after the marine mammal has been observed exiting the applicable Exclusion Zone or

following a clearance period of 15 minutes for harbor porpoise and 30 minutes for all other species where there are no further detections of the marine mammal.

Shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (*e.g.*, parametric sub-bottom profilers, sonar, Echosounder, etc.).

Seasonal Operating Requirements

As described above, a section of the proposed survey area partially overlaps with a portion of a North Atlantic right whale SMA off the port of New York/New Jersey. This SMA is active from November 1 through April 30 of each year. The survey vessel, regardless of length, would be required to adhere to vessel speed restrictions (<10 knots) when operating within the SMA during times when the SMA is active. In addition, between watch shifts, members of the monitoring team would consult NMFS' North Atlantic right whale reporting systems for the presence of North Atlantic right whales throughout survey operations. Members of the monitoring team would also monitor the NMFS North Atlantic right whale reporting systems for the establishment of Dynamic Management Areas (DMA). NMFS may also establish voluntary right whale Slow Zones any time a right whale (or whales) is acoustically detected. Attentive Energy should be aware of this possibility and remain attentive in the event a Slow Zone is established nearby or overlapping the survey area (Table 7).

Table 7 – North Atlantic Right Whale Dynamic Management Area (DMA) and Seasonal Management Area (SMA) Restrictions Within The Survey Areas

Survey area	Species	DMA restrictions	Slow zones	SMA restrictions
Lease Area	North Atlantic right whale (<i>Eubalaena glacialis</i>)	If established by NMFS, all of Attentive Energy's vessel will abide by the described restrictions		N/A
ECR North				November 1 through July 31 (Raritan Bay)
ECR South				N/A

Survey area	Species	DMA restrictions	Slow zones	SMA restrictions
<p>More information on Ship Strike Reduction for the North Atlantic right whale can be found at NMFS' website: https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-north-atlantic-right-whales</p>				

There are no known marine mammal rookeries or mating or calving grounds in the survey area that would otherwise potentially warrant increased mitigation measures for marine mammals or their habitat (or both). The proposed survey would occur in an area that has been identified as a biologically important area for migration for North Atlantic right whales. However, given the small spatial extent of the survey area relative to the substantially larger spatial extent of the right whale migratory area and the relatively low amount of noise generated by the survey, the survey is not expected to appreciably reduce the quality of migratory habitat or to negatively impact the migration of North Atlantic right whales, thus additional mitigation to address the proposed survey's occurrence in North Atlantic right whale migratory habitat is not warranted.

Vessel Strike Avoidance

Vessel operators must comply with the below measures except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

Survey vessel crewmembers responsible for navigation duties will receive site-specific training on marine mammals sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures would include the following, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- Attentive Energy will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal. A single marine mammal at the surface may indicate the presence of additional submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (species-specific distances detailed below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.*, PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to 1) distinguish marine mammal from other phenomena, and 2) broadly to identify a marine mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammals. The vessel, regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes, including seasonal management areas (SMAs) and dynamic management areas (DMAs) when in effect. See www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales for specific detail regarding these areas.

- The vessel must reduce speed to 10-knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel;

- The vessel must maintain a minimum separation distance of 500-m (1,640-ft) from right whales and other ESA-listed species. If an ESA-listed species is sighted within the relevant separation distance, the vessel must steer a course away at 10-knots or less until the 500-m separation distance has been established. If a whale is observed but cannot be confirmed as a species that is not ESA-listed, the vessel operator must assume that it is an ESA-listed species and take appropriate action.

- The vessel must maintain a minimum separation distance of 100-m (328-ft) from non-ESA-listed baleen whales.
- The vessel must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50-m (164-ft) from all other marine mammals, with an understanding that, at times, this may not be possible (*e.g.*, for animals that approach the vessel, bow-riding species).
- When marine mammal are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area, reduce speed and shift the engine to neutral). This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

Members of the monitoring team will consult NMFS North Atlantic right whale reporting system and Whale Alert, daily and as able, for the presence of North Atlantic right whales throughout survey operations, and for the establishment of a DMA. If NMFS should establish a DMA in the survey area during the survey, the vessel will abide by speed restrictions in the DMA.

Training

All PSOs must have completed a PSO training program and received NMFS approval to act as a PSO for geophysical surveys. Documentation of NMFS approval and most recent training certificates of individual PSOs' successful completion of a commercial PSO training course must be provided upon request. Further information can be found at www.fisheries.noaa.gov/national/endangered-species-conservation/protected-species-observers. In the event where third-party PSOs are not required, crew members serving as lookouts must receive training on protected species

identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements.

Attentive Energy shall instruct relevant vessel personnel with regard to the authority of the marine mammal monitoring team, and shall ensure that relevant vessel personnel and the marine mammal monitoring team participate in a joint onboard briefing (hereafter PSO briefing), led by the vessel operator and lead PSO, prior to beginning survey activities to ensure that responsibilities, communication procedures, marine mammal monitoring protocols, safety and operational procedures, and IHA requirements are clearly understood. This PSO briefing must be repeated when relevant new personnel (*e.g.*, PSOs, acoustic source operator) join the survey operations before their responsibilities and work commences.

Project-specific training will be conducted for all vessel crew prior to the start of a survey and during any changes in crew such that all survey personnel are fully aware and understand the mitigation, monitoring, and reporting requirements. All vessel crew members must be briefed in the identification of protected species that may occur in the survey area and in regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard the project vessel for identification of listed species. The expectation and process for reporting of protected species sighted during surveys must be clearly communicated and posted in highly visible locations aboard the project vessel, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process for crew members to do so. Prior to implementation with vessel crews, the training program will be provided to NMFS for review and approval. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew member understands and will comply with the necessary requirements throughout the survey activities.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the activity; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);

- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, and/or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

Proposed Monitoring Measures

Attentive Energy must use independent, dedicated, trained PSOs, meaning that the PSOs must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammal and mitigation requirements (including brief alerts regarding maritime hazards), and must have successfully completed an approved PSO training course for geophysical surveys. Visual monitoring must be performed by qualified, NMFS-approved PSOs. PSO resumes must be provided to NMFS for review and approval prior to the start of survey activities.

PSO names must be provided to NMFS by the operator for review and confirmation of their approval for specific roles prior to commencement of the survey. For prospective PSOs not previously approved, or for PSOs whose approval is not current, NMFS must review and approve PSO qualifications. Resumes should include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training.

NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who is trained but has not yet attained the requisite experience. An unconditionally-approved PSO is one who has attained the necessary experience. For unconditional approval, the PSO must have a minimum of 90 days at sea performing the role during a geophysical survey, with the conclusion of the most recent relevant experience not more than 18 months previous.

At least one of the visual PSOs aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO shall be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, who would coordinate duty schedules and roles for the PSO team and serve as primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule shall be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.

PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall be submitted to NMFS and must include written justification. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; and (3) previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties).

PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program.

PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and shall conduct visual observations using binoculars or night-vision equipment and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.

PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and may conduct a maximum of 12 hours of observation per 24-hour period.

Any observations of marine mammals by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.

Attentive Energy must work with the selected third-party PSO provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, shall include:

- At least one thermal (infrared) image device suited for the marine environment;
- Reticle binoculars (*e.g.*, 7 x 50) of appropriate quality (at least one per PSO, plus backups);
- Global Positioning Units (GPS) (at least one plus backups);
- Digital cameras with a telephoto lens that is at least 300-mm or equivalent on a full-frame single lens reflex (SLR) (at least one plus backups). The camera or lens should also have an image stabilization system;

- Equipment necessary for accurate measurement of distances to marine mammal;
- Compasses (at least one plus backups);
- Means of communication among vessel crew and PSOs; and
- Any other tools deemed necessary to adequately and effectively perform PSO tasks.

The equipment specified above may be provided by an individual PSO, the third-party PSO provider, or the operator, but Attentive Energy is responsible for ensuring PSOs have the proper equipment required to perform the duties specified in the IHA.

During good conditions (*e.g.*, daylight hours; Beaufort sea state 3 or less), PSOs shall conduct observations when the specified acoustic sources are not operating for comparison of sighting rates and behavior with and without use of the specified acoustic sources and between acquisition periods, to the maximum extent practicable.

The PSOs will be responsible for monitoring the waters surrounding the survey vessel to the farthest extent permitted by sighting conditions, including Exclusion Zones, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established Exclusion Zones during survey activities. It will be the responsibility of the PSO(s) on duty to communicate the presence of marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.

At a minimum, Attentive Energy plans to use a PSO during all HRG survey operations (*e.g.*, any day on which use of an HRG source is planned to occur), one PSO must be on duty during daylight operations on the survey vessel, conducting visual observations at all times on the active survey vessel during daylight hours (*i.e.*, from 30 minutes prior to sunrise through 30 minutes following sunset) and two PSOs will be on

watch during nighttime operations. The PSO(s) would ensure 360° visual coverage around the vessel from the most appropriate observation posts and would conduct visual observations using binoculars and/or night vision goggles and the naked eye while free from distractions and in a consistent, systematic, and diligent manner. PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and may conduct a maximum of 12 hours of observation per 24-hr period.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detect marine mammals, particularly in proximity to Exclusion Zones. Reticulated binoculars must also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine mammals. During nighttime operations, night-vision goggles with thermal clip-ons and infrared technology would be used. Position data would be recorded using hand-held or vessel GPS units for each sighting.

During good conditions (*e.g.*, daylight hours; Beaufort sea state (BSS) 3 or less), to the maximum extent practicable, PSOs would also conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the active acoustic sources. Any observations of marine mammals by crew members aboard the vessel associated with the survey would be relayed to the PSO team. Data on all PSO observations would be recorded based on standard PSO collection requirements (*see Proposed Reporting Measures*). This would include dates, times, and locations of survey operations; dates and times of observations, location and weather; details of marine mammal sightings (*e.g.*, species, numbers, behavior); and details of any observed marine mammal behavior that occurs (*e.g.*, noted behavioral disturbances).

Proposed Reporting Measures

Attentive Energy shall submit a draft comprehensive report on all activities and monitoring results within 90 days of the completion of the survey or expiration of the IHA, whichever comes sooner. The report must describe all activities conducted and sightings of marine mammals, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all marine mammals sightings (dates, times, locations, activities, associated survey activities). The draft report shall also include geo-referenced, time-stamped vessel tracklines for all time periods during which acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (*e.g.*, when the sources began operating, when they were turned off, or when they changed operational status such as from full array to single gun or vice versa). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data shall be made available. The report must summarize the information submitted in interim monthly reports (if required) as well as additional data collected. A final report must be submitted within 30 days following resolution of any comments on the draft report. All draft and final marine mammal monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov*, *nmfs.gar.incidental-take@noaa.gov* and *ITP.Harlacher@noaa.gov*.

PSOs must use standardized electronic data forms to record data. PSOs shall record detailed information about any implementation of mitigation requirements, including the distance of marine mammal to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If

required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:

1. Vessel name (source vessel), vessel size and type, maximum speed capability of vessel;
2. Dates of departures and returns to port with port name;
3. The lease number;
4. PSO names and affiliations;
5. Date and participants of PSO briefings;
6. Visual monitoring equipment used;
7. PSO location on vessel and height of observation location above water surface;
8. Dates and times (Greenwich Mean Time) of survey on/off effort and times corresponding with PSO on/off effort;
9. Vessel location (decimal degrees) when survey effort begins and ends and vessel location at beginning and end of visual PSO duty shifts;
10. Vessel location at 30-second intervals if obtainable from data collection software, otherwise at practical regular interval
11. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any change;
12. Water depth (if obtainable from data collection software);
13. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;

14. Factors that may contribute to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.*, vessel traffic, equipment malfunctions); and

15. Survey activity information (and changes thereof), such as acoustic source power output while in operation, number and volume of airguns operating in an array, tow depth of an acoustic source, and any other notes of significance (*i.e.*, pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).

Upon visual observation of any marine mammal, the following information must be recorded:

1. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
2. Vessel/survey activity at time of sighting (*e.g.*, deploying, recovering, testing, shooting, data acquisition, other);
3. PSO who sighted the animal;
4. Time of sighting;
5. Initial detection method;
6. Sightings cue;
7. Vessel location at time of sighting (decimal degrees);
8. Direction of vessel's travel (compass direction);
9. Speed of the vessel(s) from which the observation was made;
10. Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level or unidentified); also note the composition of the group if there is a mix of species;
11. Species reliability (an indicator of confidence in identification);
12. Estimated distance to the animal and method of estimating distance;

13. Estimated number of animals (high/low/best);
14. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
15. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars, or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
16. Detailed behavior observations (*e.g.*, number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior before and after point of closest approach);
17. Mitigation actions; description of any actions implemented in response to the sighting (*e.g.*, delays, shutdowns, ramp-up, speed or course alteration, etc.) and time and location of the action;
18. Equipment operating during sighting;
19. Animal's closest point of approach and/or closest distance from the center point of the acoustic source; and
20. Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up) and time and location of the action.

If a North Atlantic right whale is observed at any time by PSOs or personnel on the project vessel, during surveys or during vessel transit, Attentive Energy must report the sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866-755-6622) within two hours of occurrence, when practicable, or no later than 24 hours after occurrence. North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16 and through the WhaleAlert app (<http://www.whalealert.org>).

In the event that Attentive Energy personnel discover an injured or dead marine

mammal, regardless of the cause of injury or death or in the event that personnel involved in the survey activities discover an injured or dead marine mammal, Attentive Energy must report the incident to NMFS as soon as feasible by phone (866-755-6622) and by email (*nmfs.gar.stranding@noaa.gov* and *PR.ITP.MonitoringReports@noaa.gov*) as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
2. Species identification (if known) or description of the animal(s) involved;
3. Condition of the animal(s) (including carcass condition if the animal is dead);
4. Observed behaviors of the animal(s), if alive;
5. If available, photographs or video footage of the animal(s); and
6. General circumstances under which the animal was discovered.

In the unanticipated event of a ship strike of a marine mammal by any vessel involved in the activities covered by the IHA, Attentive Energy must report the incident to NMFS by phone (866-755-6622) and by email (*nmfs.gar.stranding@noaa.gov* and *PR.ITP.MonitoringReports@noaa.gov*) as soon as feasible. The report would include the following information:

1. Time, date, and location (latitude/longitude) of the incident;
2. Species identification (if known) or description of the animal(s) involved;
3. Vessel's speed during and leading up to the incident;
4. Vessel's course/heading and what operations were being conducted (if applicable);
5. Status of all sound sources in use;
6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

7. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
8. Estimated size and length of animal that was struck;
9. Description of the behavior of the marine mammal immediately preceding and/or following the strike;
10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
11. Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
12. To the extent practicable, photographs or video footage of the animal(s).

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be taken through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their

impacts on the baseline (*e.g.*, as reflected by the status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, and ambient noise levels).

To avoid repetition, the majority of our analysis applies to all the species listed in Table 3, given that some of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are included as separate subsections below.

NMFS does not anticipate that serious injury or mortality would result from HRG surveys, even in the absence of mitigation, and no serious injury or mortality is proposed to be authorized. As discussed in the **Potential Effects** section, non-auditory physical effects and vessel strike are not expected to occur. NMFS expects that all potential takes would be in the form of short-term Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity was occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al.*, 2007). Even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole, refer to **Potential Effects** and **Estimated Take** section for further discussion.

In addition to being temporary, the maximum expected harassment zone around a survey vessel is 141-m. Although this distance is assumed for all survey activity in estimating take numbers proposed for authorization and evaluated here, in reality, the Dual Geo-Spark 2000X would likely not be used across the entire 24-hour period and

across all 56 days. As noted in their application, the other acoustic sources Attentive Energy has included in their application have minimal Level B harassment zones.

Therefore, when not using the sparker, the ensonified area surrounding the vessel is small compared to the overall distribution of the animals and ambient sound in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the survey area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

There are no rookeries, mating or calving grounds known to be biologically important to marine mammals within the proposed survey area and there are no feeding areas known to be biologically important to marine mammals within the proposed survey area. There is no designated critical habitat for any ESA-listed marine mammals in the proposed survey area.

North Atlantic Right Whales

The status of the North Atlantic right whale population is of heightened concern and, therefore, merits additional analysis. As noted previously, elevated North Atlantic right whale mortalities began in June 2017 and there is an active UME. Overall, preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of right whales. As noted previously, the proposed survey area overlaps a migratory corridor BIA for North Atlantic right whales. Due to the fact that the proposed survey activities are temporary and the spatial extent of sound produced by the survey would be very small relative to the

spatial extent of the available migratory habitat in the BIA, right whale migration is not expected to be impacted by the proposed survey. Given the relatively small size of the ensonified area, it is unlikely that prey availability would be adversely affected by HRG survey operations. Required vessel strike avoidance measures will also decrease risk of ship strike during migration; no ship strike is expected to occur during Attentive Energy's proposed activities. The 500-m shutdown zone for right whales is conservative, considering the Level B harassment isopleth for the most impactful acoustic source (*i.e.*, sparker) is estimated to be 141-m, and thereby minimizes the potential for behavioral harassment of this species.

As noted previously, Level A harassment is not expected due to the small PTS zones associated with HRG equipment types proposed for use. The proposed authorizations for Level B harassment takes of North Atlantic right whale are not expected to exacerbate or compound upon the ongoing UME. The limited North Atlantic right whale Level B harassment takes proposed for authorization are expected to be of a short duration, and given the number of estimated takes, repeated exposures of the same individual are not expected. Further, given the relatively small size of the ensonified area during Attentive Energy's proposed activities, it is unlikely that North Atlantic right whale prey availability would be adversely affected. Accordingly, NMFS does not anticipate North Atlantic right whales takes that would result from Attentive Energy's proposed activities would impact annual rates of recruitment or survival. Thus, any takes that occur would not result in population level impacts.

Other Marine Mammal Species with Active UMEs

As noted previously, there are several active UMEs occurring in the vicinity of Attentive Energy proposed survey area. Elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since January 2016. Of the cases examined, approximately half had evidence of human interaction (ship strike or

entanglement). The UME does not yet provide cause for concern regarding population-level impacts. Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or DPS) remains stable at approximately 12,000 individuals.

Beginning in January 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in Massachusetts, Maine, and New York. This event does not provide cause for concern regarding population level impacts, as the likely population abundance is greater than 20,000 whales.

The required mitigation measures are expected to reduce the number and/or severity of proposed takes for all species listed in Table 2, including those with active UMEs, to the level of least practicable adverse impact. In particular, they would provide animals the opportunity to move away from the sound source throughout the survey area before HRG survey equipment reaches full energy, thus preventing them from being exposed to sound levels that have the potential to cause injury (Level A harassment) or more severe Level B harassment. As discussed previously, take by Level A harassment (injury) is considered unlikely, even absent mitigation, based on the characteristics of the signals produced by the acoustic sources planned for use, and is not proposed for authorization. Implementation of required mitigation would further reduce this potential. Therefore, NMFS is not proposing any Level A harassment for authorization.

NMFS expects that takes would be in the form of short-term Level B behavioral harassment by way of brief startling reactions and/or temporary vacating of the area, or decreased foraging (if such activity was occurring)—reactions that (at the scale and intensity anticipated here) are considered to be of low severity, with no lasting biological consequences. Since both the sources and marine mammals are mobile, animals would only be exposed briefly to a small ensonified area that might result in take. Additionally,

required mitigation measures would further reduce exposure to sound that could result in more severe behavioral harassment.

Biologically Important Areas for Other Species

As previously discussed, impacts from the proposed project are expected to be localized to the specific area of activity and only during periods of time where Attentive Energy's acoustic sources are active. While areas of biological importance to fin whales, humpback whales, and harbor seals can be found off the coast of New Jersey and New York, NMFS does not expect this proposed action to affect these areas. This is due to the combination of the mitigation and monitoring measures being required of Attentive Energy's as well as the location of these biologically important areas. All of these important areas are found outside of the range of this survey area, as is the case with fin whales and humpback whales (BIAs found further north), and, therefore, not expected to be impacted by Attentive Energy's proposed survey activities.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect any of the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;
- No Level A harassment (PTS) is anticipated, even in the absence of mitigation measures, or proposed for authorization;
- Foraging success is not likely to be impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the survey area during the planned survey to avoid exposure to sounds from the activity;

- Take is anticipated to be by Level B behavioral harassment only consisting of brief startling reactions and/or temporary avoidance of the survey area;
- While the survey area is within areas noted as a migratory BIA for North Atlantic right whales, the activities would occur in such a comparatively small area such that any avoidance of the survey area due to activities would not affect migration; and
- The proposed mitigation measures, including effective visual monitoring, and shutdowns are expected to minimize potential impacts to marine mammals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

NMFS proposes to authorize incidental take (by Level B harassment only) of 15 marine mammal species (with 15 managed stocks). The total amount of takes proposed

for authorization relative to the best available population abundance is less than 1 percent for all stocks (Table 7).

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that only small numbers of marine mammals would be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

NMFS OPR is proposing to authorize take of four species of marine mammals which are listed under the ESA, including the North Atlantic right, fin, sei, and sperm whale, and has determined that this activity falls within the scope of activities analyzed in NMFS Greater Atlantic Regional Fisheries Office's (GARFO) programmatic consultation regarding geophysical surveys along the U.S. Atlantic coast in the three Atlantic Renewable Energy Regions (completed June 29, 2021; revised September 2021).

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Attentive Energy for conducting marine site characterization surveys off the coast of New York and New Jersey from August 1, 2022 to July 31, 2023, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at:

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable>.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed marine site characterization surveys. We also request comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, one-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the **Description of Proposed Activities** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activities** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA).
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: June 21, 2022.

Kimberly Damon-Randall,
Director, Office of Protected Resources,
National Marine Fisheries Service.